

REMARKS

I. Introduction

In response to the Office Action dated July 25, 2005, claims 1 and 9 have been amended, and claims 17-20 have been added. Claims 1-20 remain in the application. Re-examination and re-consideration of the application, as amended, is requested.

II. Prior Art Rejections

On page (2) of the Office Action, claims 1, 2, 9, and 10 were rejected under 35 U.S.C. §102(e) as being anticipated by Wind et al. (Wind), U.S. Patent No. 6,836,115. On page (3) of the Office Action, claims 4, 6, 12, and 14 were rejected under 35 U.S.C. §103(a) as being unpatentable in view of the combination of Wind and Harmon, U.S. Patent No. 5,406,479. However, on page 3, in paragraphs (3) and (4) of the Office Action, claims 3, 5, 7, 8, 11, 13, 15, and 16 were indicated as being allowable if rewritten in independent form to include the base claim and any intervening claims.

Applicant acknowledges the indication of allowable claims, but respectfully traverses these rejections.

Specifically, claims 1 and 9 were rejected as follows:

As to claims 1 and 9, Wind teaches a system and method for conducting magnetic resonance tomography, including a static magnetic field (first magnetic field), a radio magnetic field, and a second sinusoidal magnetic field (like a magnetic field produced by a ferromagnetic sphere; column 6, lines 12-43, figure 12). Wind further teaches a non-crystalline sample under an influence of the first magnetic field to simultaneously obtain two or more magnetically resonant spins of the sample by sequentially angularly rotating the sample around a prescribed axis (figures 1-12).

Applicant traverses the above rejections. Specifically, the present invention is in no way similar to Wind, and no person of ordinary skill in the art would in any possible way foresee the presently claimed invention based on the Wind patent.

In the present invention, in addition to the large magnetic field (the first magnetic field) and perpendicular RF field (as in all magnetic resonance instruments/devices/patents/etc.), the sample is additionally under the influence of the field from a ferromagnetic sphere. Nowhere in the Wind patent is the field from a ferromagnetic sphere or any other ferromagnetic object of any shape or size proposed or suggested or analyzed.

The Office Action asserts that Wind provides a "second sinusoidal magnetic field (like a magnetic field produced by a ferromagnetic sphere)". Applicants assert that such a statement is fundamentally incorrect. In the Wind patent, the sinusoidal magnetic field is a time-dependent magnetic field (see col. 6, lines 12-43; col. 14, lines 28-50). However, the field from the ferromagnetic sphere as claimed is not time-dependent but constant, and it is NOT sinusoidal. In fact the field from the ferromagnetic sphere of the presently claimed invention has no time-dependence and is not sinusoidal in time or space, but has a spatial dependence as described in the specification in equation 1 and 2 (see paragraphs [0036]-[0038]), and this spatial dependence is illustrated in FIGs. 1 and 4. Applicants also note that such spatial dependency from the equations has been added to the independent claims. Further, the new dependent claims provide specific details from the equations. Nothing of this nature appears in the Wind patent.

The patent by Wind et al. is based on the idea of time-dependent Magic Angle Spinning in magnetic resonance to narrow the linewidths in the magnetic resonance spectrum and thereby obtain higher spectral and spatial resolution (see col. 3, line 16-col. 4, line 56; col. 5, lines 9-12; and col. 9, lines 3-17). In the present invention, a static ultra-high magnetic field gradients from a ferromagnetic sphere are used to obtain high spatial resolution imaging.

In addition, Applicants note that the Wind patent relies on the sample being tilted at ~54 degrees (see col. 5, line 33, 46, and 58, col. 6, line 25, 38, 51, 67; col. 10, lines 14-15, and 22), whereas as described in the present invention, the optimal sample position is at ~63 degrees from the normal.

The Wind patent also performs the rotation of the sample for the purpose of narrowing the spectral lines, while the present invention's rotation of the sample is performed for the purpose of slicing the sample by the magnetic fields from the ferromagnetic sphere in order to perform tomographic imaging (see the independent claims). The two purposes are fundamentally different physical principles, and the rotation for the two cases is performed for two fundamentally different purposes.

As for the rejections based on 35 U.S.C. § 103(a) of claims 4, 6, 12, and 14, the present invention is not solely directed towards the Fourier transform filtered backprojection method. Instead, the novel claim limitations provide that fields from a ferromagnetic sphere as described by equations 1 and 2 and shown in the diagram of figure 1, (although very different from any other

tomographic imaging that uses Fourier transform filtered backprojection method), can be used to perform high resolution magnetic resonance tomography using that method of image reconstruction. Further, such tomography can be done by positioning and rotating the sample as described in the claims and specification, so that the sample is sliced in the proper way to perform backprojection image reconstruction. This is not at all obvious and no person of ordinary skill in the art would in any possible way foresee this method of tomographic imaging based on previous patents/knowledge.

Moreover, the various elements of Applicant's claimed invention together provide operational advantages over Wind and Harman. In addition, Applicant's invention solves problems not recognized by Wind and Harman.

Thus, Applicant submits that independent claims 1 and 9 are allowable over Wind and Harman. Further, dependent claims 2-8 and 10-20 are submitted to be allowable over Wind and Harman in the same manner, because they are dependent on independent claims 1 and 9, respectively, and thus contain all the limitations of the independent claims. In addition, dependent claims 2-8 and 10-20 recite additional novel elements not shown by Wind and Harman.

III. Conclusion

In view of the above, it is submitted that this application is now in good order for allowance and such allowance is respectfully solicited. Should the Examiner believe minor matters still remain that can be resolved in a telephone interview, the Examiner is urged to call Applicant's undersigned attorney.

Respectfully submitted,

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